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ADDING A TTL MONITOR TO YOUR TS-2068

Gary Lessenberry

Have you ever tried to work in 64 colunm mode with a color television? Even if your color TV is fine for 32 column text and games, it can be a visual nightmare with 64 column text. Like many of us, I was hessitant to spend $200+ for an RGB monitor and a composite monitor just wasn't quite clear enough to make it worthwhile. The solution was one of the many monochrome TTL monitors that can be found in the Computer Shopper each month for $20 or so. Several of us ordered Panasonic Model K-904B1 displays from BG Micro. These are brand new units that come with a service manual. The monitors were uncased and without a power supply. Building a retangular wooden box to set the chasis in was easy. However, the power supply was a little more difficult. It required a 12 VDC, 1 Amp power supply which can be expensive when purchased over the counter. I found a power supply from Jameco Electronics (Part #PS72559) that sold for $14.95 and provides a single power source for my monitor, TS-2068, Disk Drives (2), TS-2050 and WICO Trackball. I will explain how to interface this power supply in an article in our May issue.

I now had everything that I needed, except for an interface. TTL monitor interfaces are not available on the TS market. Our TTL interface is actually a a modification of the John Oliger RGB interface. The pins of you TS-2068 edge card that are used for this are:

B4 (+5VDC) B27 (Red)
B28 (Green) B29 (Blue)
B31 (Video) B32 (Ground)

Side B of the 2068 motherboard is the non-component side. There are two steps to this project: modifying the 2068 and building the TTL interface.

Parts needed aree:
U2 74HC00 Quad AND Gate IC
U1 7432 Quad OR Gate IC
R2 47K ohm, 1/8 watt resistor
R1 1K ohm variable resistor
32 pin edge connector
ribbon cable
perferated board
wire wrap wire
soldering iron & solder
exacto knife (to cut trace)

The modification to the 2068 is an easy one (see fig), cut the trace that terminates immediately behind edge slot A31 on the top (component side) of the motherboard. Solder a jumper (using wire wrap wire) from the center leg of Q5 to the solder dot at the right of the severed trace. This allows the DC clamped b/w composite video at the base of Q5 to be delivered to the edge connnector pin B31.

On your perferated board, you will build the two interface circuits shown in the figures. To OR gate the RGB signals into a compatible video signal, construct the following: B27 (RED) to U1/1, B28 (GREEN) to U1/2, B29 (BLUE) to U1/4, B32 (GROUND) to U1/5 & U1/7, B4 (+5vdc) to U1/14, U1/3 to U1/9, U1/6 to U1/10, U1/8 to R1, B32 (GROUND) to R2. The second circuit on the perferated card will provide the horizontal and vertical syncs. Construct the following: B31 (VIDEO) to R2, R2 to U2/1, B4 (+5vdc) to U2/2 & U2/14, U2/3 to U2/4 & U2/5, B32 (GROUND) to U2/7. The outputs from this interface will go to the following: U2/6 (positive sync input) to the vert sync and horiz sync on monitor, R1 wiper (video input) to the video input on monitor.

This monitor will provide you with the cleanest, clearest high resolution text of any monitor available for the TS-2068. However, be advised that since the colors are all gated together, you will display only color or black. If you are using a program that that has the ink, boarder and paper at colors other than black, your screen with be solid green without any distinguishing features! The best combination of boarder, paper and ink are boarder 0, paper 0 and ink 7.

AN EASY IMPROVEMENT FOR YOUR TS-2068 KEYBOARD

Al Feng

Chiclet-type keyboards are fine for hand held calculators, but they leave a lot to be desired on an otherwise full-sized computer keyboard. Both the TS-2068 and the Spectrum are nailed with this weakness as users of Tasword II and Mscript will attest. For those of you who have a desire to improve your TS-2068/Spectrum keyboard, but do not have the skill or inclination to rewire one of the many mechanical keyboards available on the market, nor the funds for a SAGA 3 ELITE Keyboard ($100.00), here as fairly simple solution that can be done in less than a hour's time.

The following solution evolved after several unsuccessful efforts to rewire a number of salvage keyboards. Rather than try rewireing yet another mechanical keyboard, it finally occured to me that I could "glue" a set of keytops directly onto the chiclets. What you will need other than your TS-2068 is a set of keytops, and an appropriate adhesive.

If you don't already have a set of keytops, you can find "salvage" keyboards at any number of outlets. The most readily available was designed for the TEXAS INSTRUMENTS 99/4A computer. This is both inexpensive (maybe $4 to $6) and adequate. Try looking for it at a Radio Shack if you have one in your area. Another supplier of keyboards (TI 99/4A, COMMODORE 64, ADAM) is

AMERICAN DESIGN COMPONENTS (62 Joseph St., Moonachie, NY 07074). The keytops from some other keyboards may have stems on their bottoms which must be removed. If this is the case, they may be trimmed off using an X-acto razor saw.

I used SHOE-GOO as the adhesive (it is a non-reactive, rubber cement-like product for repairing athletic shoes). GOOP, a similar product, will "eat" into plastic. The SHOE-GOO should be applied very sparingly to avoid excess dripping down the sides of the chiclet (this is the only hazard which you should encounter in the procedure). If too much is applied, it is better to wait until the compound has hardened. The excess can be peeled and/or trimmed away, and the keytop reattatched.

There are several alternate solutions to resolve the matter of non-matching symbols. You can paint new symbols over the "wrong" engravings; or, you can apply LIQUID PAPER for INK, and then draw the correct symbols in place; or make an overlay from a self-sticking lable covered by clear contact paper. The LIQUID PAPER is probably the easiest solution.

Allow the SHOE-GOO to harden over night, tape a copy of the keyboard from either the reference card or your User Manual onto the top of your computer, and enjoy your improved keyboard!

BUILD A SPECTRUM ROMSWITCHING CIRCUIT FOR YOUR TS-2068

Gary Lessenberry

I recently purchased some Spectrum ROMs from Zebra Systems with the hope that I might be able to make my own Spectrum romswitch circuit without paying the high price of those commercial circuits that are available. When I examined the TS-2068's ROM circuitry, I realized that this was an easier task than I had originally assumed! All that I needed was: a Spectrum ROM, a toggle switch, two feet of insulated wire and two 10K ohm resistors.

To start the project, you first remove the top from your computer case by removing the seven screws in the bottom of the case. When you look inside, it will appear as in figure 1. You now remove the Timex ROM (U16). To remove it, gently pry it with a small screwdriver or knife inserted between the socket and the ROM.

It is important that you test your Spectrum ROM before constructing this circuit. To test it, place it in the socket from which you have removed the TS-2068 ROM and energize you computer. The Sinclair copyright should be displayed. If not, your ROM may be defective. Remove the Spectrum ROM after the test.

Take your Timex ROM and place your Spectrum ROM directly over it, match the notches. There should only be a thin space between the two ROMs and all of their leads should be touching. Do not leave a lot of space between these ROMs because clearance is critical when you reassemble your computer! You will now, very gently, bend pin 20 on both ROMs upward untill they are perpindicular to the other pins. You may now solder all of the pins except pin 20. Be careful when soldering. Allow 30 seconds before soldering the next pin so that you won't overheat and damage the ROMs. To pin 20 of each ROM, you will solder a peice of wire and one end of a 10K ohm resistor. The other end of each 10K ohm resistor will be soldered to pin 28 (+5vdc). The other end of the two wires that you have comming from pin 20 of the two ROMs will be soldered to the toggle switch. The toggle switch has three pins on it. Two of these pins are labled "ON". Solder one wire to each of these two pins. Another wire will be soldered to the middle pin of the the toggle switch with the other end of that wire going to the circuit board and soldered to W1.

At this point, you may reinstall your ROMs into their socket. A hole must be drilled in the rear of your case for mounting the toggle switch. After the toggle switch has been installed, you may replace the top of your computer. Be careful when reinstalling the top of the computer to ensure that there is proper clearance and nothing is being forced!

Once your computer is reassembled, you may test it out. You can tell which ROM is selected by the copyright notice. When in the Spectrum mode, the Sinclair copyright will be displayed. When the TS-2068 mode is selected, the Timex and Sinclair copyrights will both be displayed.

If you have any proplems or questions, you may call me at (312) 473-9415 or leave me a note at the Nite Owl Special BBS (312) 459-5721.